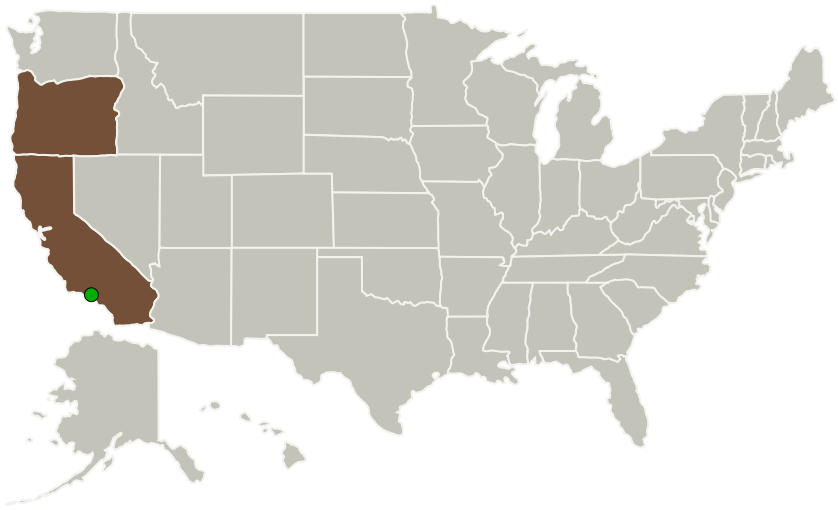
Titan Montgolfiere Terrestrial Test Bed, Phase II

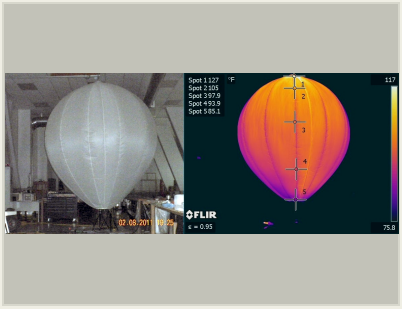
Completed Technology Project (2012 - 2014)

Project Introduction

With the Titan Saturn System Mission, NASA is proposing to send a Montgolfiere balloon to probe the atmosphere of Titan. To better plan this mission and create a robust optimized balloon design, NASA requires the ability to more accurately evaluate the convective heat transfer characteristics of the balloon operating in Titan's atmosphere. Based on limitations of previous efforts, NASA has requested proposals for a testbed to support CFD validation. Leveraging the results of the Phase I effort, Near Space Corporation (NSC), proposes to develop and operate two full scale Testbeds (~9 m diameter) in order to help validate CFD models for the TSSM Titan Montgolfiere balloon. The Testbeds will incorporate new envelope design innovations and state-of-the-art data acquisition methods to enable data intensive tethered and free-flight tests. Utilizing its unique balloon facility located in a large blimp hangar, NSC will conduct iterative tethered hangar tests of the full scale Testbeds (which is not possible in existing cryogenic test chambers). These flights will enable better IR imaging and flow characterization measurements. The acquired data will provide critical input to incrementally improve and validate the CFD models. The outdoor drop/inflation test and a free flight test will retire technology risks associated with the future Titan mission in addition to generating the validation data necessary to improve the existing CFD models. NSC proposes to develop and operate a mature TMTT system during Phase II, generate pertinent data that will be used to improve the CFD models, and leverage the effort to create valuable technology with both NASA and non-NASA commercial applications.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
GSSL, Inc.	Lead Organization	Industry	Tillamook, Oregon
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Oregon

Project Transitions

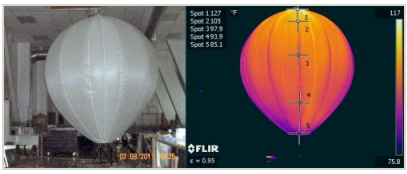
April 2012: Project Start

April 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140667)*

Images



Project Image
Titan Montgolfiere Terrestrial Test Bed
(https://techport.nasa.gov/image/136664)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
GSSL, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

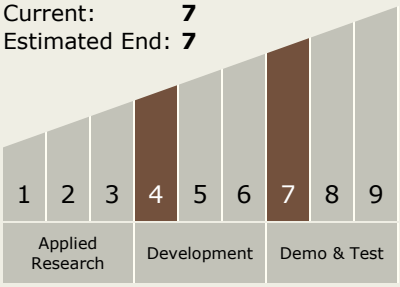
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Timothy Lachenmeier

Technology Maturity (TRL)

Start: **4**
Current: **7**
Estimated End: **7**



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Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.5 Modeling and Simulation for EDL

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System